



WATER SECURITY
Knowledge Exchange Programme



Specific Priority Subject 2.1 Summary Report

Improving flood prediction, communication and impact assessment

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Acronyms

WSKEP Water Security Knowledge Exchange Programme

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Summary

This report is the Summary Outcomes Report of the WSKEP Specific Priority Subject Workshop 2.1 on 'Improving flood prediction, communication and impact assessment'. It includes an introduction reporting the key recommendations resulting from the Workshop. This document will be made available on the Programme website www.wskep.net. The full Participants Outcomes Report was distributed to all participants of the Workshop.

Disclaimer

This document reflects only the combined views of participants at the Workshop.

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1. Overview

1.1. Introduction

Within the overall theme of increasing resilience to extreme events, the workshop focused on the challenge of improving flood prediction, communication and impact assessment. The major policy drivers in the UK are the EU Floods Directive, the Flood and Water Management Act 2010 and the Flood Risk Management (Scotland) Act 2009. The legislation formalises the requirement to assess the risk of flooding from all sources, including fluvial, surface water, coastal, groundwater and sewer flooding, and underlines the importance of good communication with key stakeholders. Many recent improvements in flood risk management practice stem from the recommendations made in the Pitt Review of the 2007 floods. A good example of multidisciplinary coordination is given by the Flood Forecasting Centre and the Scottish Flood Forecasting Service, both of which combine the expertise of hydrologists and meteorologists to provide flood warnings to the emergency services, local authorities and other Category 1 and 2 responders.

1.2. What is the big science issue / challenge

The workshop demonstrated that the science of flood prediction in the UK and beyond is relatively well developed, with a long history of research into statistical flood frequency, catchment flood modelling and flood forecasting, amongst other things. Even so, a number of key research challenges remain, including:

- Improving the characterisation of risk and uncertainty
- Flood prediction in a non-stationary environment – resulting from climate change, land use change, population growth
- Issues of scale and the application of high resolution digital data.

A number of issues worthy of particular consideration were identified at the workshop including:

- Access, consistency and reliability of relevant datasets
- Research leading to guidance on local flood defence investment
- The communication of uncertainty and general communication issues between technical specialists and end users
- The health impacts of floods
- Full documentation of past events leading to the assessment of lessons learnt
- International knowledge transfer to support disaster risk reduction.

1.3. Networks and alliances

One of the problems limiting the effectiveness of communication between researchers and practitioners is that end users of research tend to engage, as the term implies, at the end of the process when results are forthcoming. Therefore a major challenge is to involve stakeholders throughout the lifetime of the research project, from the point of initiation of the original

idea. Thus, a model is encouraged where researchers, knowledge and ideas can move into and out of different host organisations quickly, and resources such as funding and equipment can be drawn into projects from diverse sources as required. The wide range of groups with an interest in flood prediction and impact assessment, from government agencies to individuals living in a flood risk zone, adds further complexity to the situation.

The workshop participants discussed some of the existing alliances and networks in this area of research and considered ways of improving the communication of flood risk and thus reducing the likely impacts of flooding. An example of a recently formed network is the Natural Hazards Partnership (NHP), led by the Met Office, which was created with the encouragement of the Cabinet Office and the Government Office for Science. It involves thirteen collaborating government agencies including four NERC research centres, Ordnance Survey, the Environment Agency and the Health Protection Agency. It is already providing Government with valuable coordinated advice through a single point of contact on a range of natural hazards driven by extreme weather including floods, droughts, wildfires and landslides.

1.4. The Water Security KE Programme

The workshop participants offered suggestions for maximising the value of the Water Security Knowledge Exchange Programme. One recurring theme was the need to document and analyse the complete life cycle of flood events so that stakeholders could work together to improve community resilience. In particular, the impacts of flooding on the health of individuals and communities were an important consideration that tended to be forgotten soon after the flood waters subsided. Other suggestions included making data and models freely available and encouraging secondments between end users and research organisations.

2. The workshop and report

This workshop was the fifth in a series being run on behalf of the Water Security Knowledge Exchange Programme (WSKEP) with funding from NERC. It was organized by the Centre for Ecology & Hydrology (CEH) Wallingford.

Nine Priority Subjects were identified at a national consultation event held in June 2011. The theme of this workshop was ‘Improving flood prediction, communication and impact assessment’.

The workshop was designed to support the following key aims:

- To increase awareness and uptake of research outputs in the focus area of ‘improving flood prediction, communication and impact assessment’
- To identify user needs and potential future research projects
- To strengthen research/user group collaboration and networks

The workshop was divided into four sessions with initial presentations (available separately) as follows:

Session 1 Setting the scene and making connections

Introduction: Graham Leeks, Water Security Knowledge Exchange Programme Lead, CEH

Towards a shared understanding of Priority Subject Area

Introduction: Lisa Stewart, FEH Team Leader, CEH Wallingford

Session 2 Making the most of current research activity

Introduction: Thomas Kjeldsen, Senior Hydrologist, CEH Wallingford

Session 3 Identify areas for future research activity/collaborations

Introduction: Neil Runnalls, WSKEP Programme Development Manager, CEH

Session 4 Alliances, networks and advice to the WSKEP

Introduction: Dr Carolyn Roberts, Director, Environmental Sustainability Knowledge Transfer Network, University of Oxford

The heart of the workshop time was devoted to opportunities for participative working among the 25 delegates. This Report features the outcomes from those interactions as written up by delegates during the sessions. As such this report is primarily aimed as an 'aide memoire' for participants.

Elements from this report will be used to inform further development of the Water Security KEP.

3. Towards a shared understanding of the Priority Subject Area

Table groups discussed the contextual presentation by Lisa Stewart and noted key insights and issues, supported by a brief narrative, that enrich the Priority Subject Area, as follows:

Ref	Insight/issue
3.1	<ul style="list-style-type: none"> How can research give us more reliable guidance on local flood defence investment?
3.2	<ul style="list-style-type: none"> Access, consistency and reliability of datasets Consistency estimation, application and communication of uncertainty
3.3	<ul style="list-style-type: none"> Use more international knowledge transfer to support disaster risk reduction Research must inform the Climate Change Risk Assessment (CCRA) and national adaptation programme Focus needed on Health impacts
3.4	<ul style="list-style-type: none"> Need for communication/perception/understanding of uncertainty

	<ul style="list-style-type: none"> • Cascading impacts • Sharing of new data sources/standardisation best practice
3.5	<ul style="list-style-type: none"> • Impacts – fundamental research on vehicles, transport systems, people and their behaviour to inform emergency planning • Communication amongst technical specialists and 'non specialist' end users

4. Making the most of current research activity

This session gave participants the opportunity to learn more about current research programmes and to make new connections to add value to research taking place. Thomas Kjeldsen, Senior Hydrologist, CEH Wallingford gave an overview of research projects.

Individuals then gave a short introduction to research work they were involved with. Other participants had the opportunity to connect with programmes that interested them. Comments were captured, and participants logged their interest. 25 connections were identified across 11 research programmes.

5. Identify areas for potential future research activity / collaborations

Through table group discussions, individuals were invited to identify key propositions where further research/activity could be of value in taking forward this Priority Subject Area.

Other delegates were invited to join in a conversation to further develop the proposition and indicate if they were interested in collaboration in this area, beyond the workshop.

Fourteen propositions were developed and discussed, as follows:

Ref	Propositions for further research / activity
5.1	Concerted action on improving long term records – history, palaeo, grey literature, 'grey data'
5.2	Joint Probability – for critical infrastructure – pluvial, fluvial + coastal flood risk
5.3	Research the extreme of the extreme floods using new data sources (e.g. anecdotal, historic and sediment data)
5.4	Need standard "flood" datasets (Rainfall, Flows, Impact)
5.5	Life-cycle of a flood (Standardisation of Flood Documentation)
5.6	Standardisation/ sharing of data – continuity and stewardship issues

5.7	Flood forecasting for non-fluvial and coastal water bodies (e.g. canals, sewers etc.)
5.8	Real-time tools for impact assessment to assist decision making
5.9	Improved rainfall forecasts and merging measurements from different sensors
5.10	<ul style="list-style-type: none"> Emergency planning Impacts of floods on people, buildings and cars using experiments (i.e. Physical models and response) Resilience – Improving resilience of people, buildings, systems, businesses etc.
5.11	Health impacts of floods & risk to health facilities Build epidemiological tools
5.12	Need for research to feed downwards to help substantiate assumptions made during assessment of impacts of flooding.
5.13	How do we mitigate/protect against non-fluvial/coastal floods and pluvial groundwater
5.14	Future scenarios of other factors affecting water security. (E.g. population, demand, land use etc.), not just rainfall, temperature, evaporation etc.

6. Improving alliances and networks

Dr Carolyn Roberts, Environmental Sustainability Knowledge Transfer Network, University of Oxford, gave an overview of alliances and network approaches that help foster research and practice in this area.

Delegates, in table groups, were then invited to make suggestions for steps to further improve communication and networking, as follows:

Ref	Suggestions to improve networks/communication
6.1	Include HPA & Department of Health on network list.
6.2	Finding methods to incentivise end users to participate in alliances and networks.
6.3	UK Benchmarks – cast study sites (data rich) for cross-validation.
6.4	Forbid alliances and networks; they are too cliquey!
6.5	Innovation Day: connecting civil engineering consultancies with academics. (British Water have done similar events with Yorkshire and Southern Water)

7. How do we maximise the value of the Water Security KEP?

Table groups were invited to suggest ways to maximise the value of the Water Security Knowledge Exchange programme, as follows:

Ref	Insights for WSKEP
7.1	Life cycle analysis for all science & community partnerships to produce effective community resilience.
7.2	Staff exchange/ secondments between end users and research organisations could strengthen alliances/ networks and be mutually beneficial.
7.3	Freely available data and models which have been obtained/implemented at public expense.
7.4	Imagine event where users/practitioners/researcher highlight example of success in Knowledge Exchange – how did we get through the pipe?